pear an exception to the general rule respecting buds and roots; but the author observes, that the tuber differs but little from a branch which has dilated instead of extending itself. The runners, which give existence to the tubers beneath the soil, are very similar in organization to the stem of the plant; and if exposed, readily emit leaves, and perform all the functions of the stem; and, on the other hand, Mr. Knight has shown, in a former memoir, that the buds on any part of the stem may be made to produce tubers similar to those formed beneath the soil; but he has never, under any circumstances, been able to obtain tubers from the fibrous roots of the plant.

Many naturalists have imagined the fibrous roots of all plants to be of annual duration only, because those of bulbous and tuberous plants certainly are so; but Mr. Knight observes, that the organization of trees is extremely different; and he has not found any portion of their roots to be deciduous.

On the Nature of the intervertebral Substance in Fish and Quadrupeds. *By* Everard Home, *Esq. F.R.S.* Read February 23, 1809. [*Phil. Trans.* 1809, *p.* 177.]

The author, having observed a new species of joint in the *Squalus maximus* of Linnæus, takes occasion to trace the successive gradations of a similar structure, through various kinds of fish, to the more remote resemblance to be found in quadrupeds and in men.

In the Squalus each joint of the spine approaches, in some measure, to that which is termed the ball and socket joint, as a concave surface of each vertebra is applied to a ball; but the ball, in this instance, is not, as in other cases, a smooth surface covering a solid bone, but a collection of fluid contained in a bag that is nearly spherical, round which the concave surfaces of the vertebræ are moved.

In a fish of thirty feet in length, the diameter of the body of one of the largest vertebræ measured seven inches; the quantity of fluid in one of the cavities amounted to three pints; the ligamentous substance, which unites the vertebræ, being nearly one inch in thickness, externally very compact and elastic, but internally possessed of but little elasticity.

The elasticity of these ligaments preserves the straitness of the spine when it is not acted upon by the muscles, or by other external force; and though the extent of motion, in any one joint, must be small, their number affords considerable latitude of motion.

Since the vertebræ, in other fish, are found with concavities in each surface, it was natural to expect a corresponding resemblance in the intervertebral structure; and in the skate this was found to be the case, and the cavity nearly spherical, as in the Squalus. In the common eel it is more oblong, the longitudinal diameter exceeding the transverse one by about one third.

In the sturgeon the structure varies considerably, as the cavities communicate with each other by apertures through the bodies of the vertebræ, which in this fish are cartilaginous rings, connected toge-

ther by ligament, and forming a tube communicating from one extremity of the spine to the other.

This species of intervertebral joint, which thus appears common to the fish tribe, is not found to obtain in the whales, as their structure in this, as in many other respects, is the same as that of quadrupeds, but is more distinctly visible, from the vast size of the parts. In them the intervertebral substance is arranged in concentric circles, connected by transverse fibres, the external layers being very firm and compact; but the interior become successively softer, till in the centre there is a soft pliant substance, more like jelly than an organized body, corresponding in its use to the incompressible fluid in fish.

In the bullock, sheep, deer, monkey, and man, the structure corresponds with that of the whale; but in the hog and rabbit a cavity was observed, with a smooth internal surface extending through half the diameter of the vertebræ; so that the structure in these animals imitates that of fishes, though not for any obvious purpose.

In the alligator the several joints are regularly articulated with capsular ligaments, and are lubricated with synovia. In the snake there is a regular ball and socket joint between every two vertebræ; so that the means employed for the motion of the back-bone in different animals, comprehends almost every species of joint.

Mr. Home's paper has annexed to it an appendix, by Mr. William Brande, giving an account of the chemical analysis of the fluid contained in the intervertebral cavity of the *Squalus maximus*.

Its specific gravity was found to be ·1027. It was not coagulated by heat.

No precipitation was occasioned by infusion of galls, or of catechu; nor was any change produced by alcohol.

But oxymuriate of mercury, muriate of tin, nitrate of silver, and acetate of lead, threw down copious precipitates.

From the effect of these re-agents, it appears to Mr. Brande, that the fluid contains neither gelatine nor albumen; but when the fluid was evaporated to half its bulk, pellicles began to form on the surface, indicating the presence of a variety of animal matter, which the author considers as *mucus* or *mucilage*, but which, under certain circumstances of evaporation, is capable of being converted into a modification of gelatine or albumen.

On Platina and native Palladium from Brazil. *By* William Hyde Wollaston, *M.D. Sec. R.S.* Read March 22, 1809. [*Phil. Trans.* 1809, *p.* 189.]

Until a portion of platina was lately discovered by M. Vauquelin, in some silver ores from Estremadura, the whole of the platina known in Europe was derived from the Spanish possessions in South America, and had very uniformly the same appearance, differing solely in the magnitude of the grains.

A third variety having lately been received from Brazil, the author